

# VEHICLE-TO-GRID WITH SOLID OXIDE FUEL CELLS

Felix Moog (B. Sc.)  
Mario Bohnenberger (B. A.)

How efficient mobility can accompany controlled energy supply to grid

### Challenges in the context of the energy transition

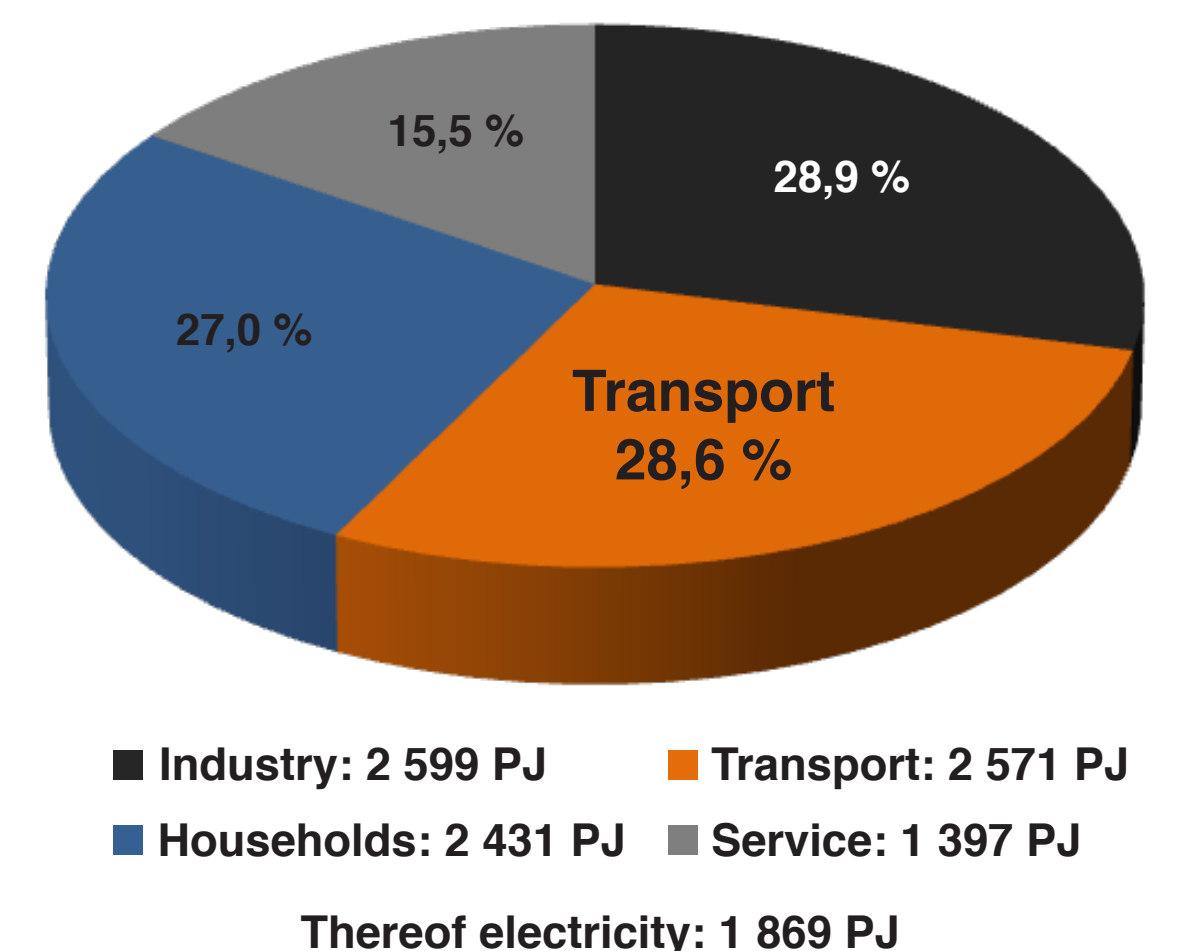
#### Mobility sector

- Bringing requirements (especially the car range) in accordance with availability of renewable energy sources
- Reduction of final energy consumption

#### Electricity sector

- Flexible power plants to complement photovoltaics and wind turbines
- Growing demand of control reserve

### Final energy consumption in Germany by sectors (2012)<sup>1</sup>



### Concept: Continuous operation of solid oxide fuel cells (SOFCs) in vehicles

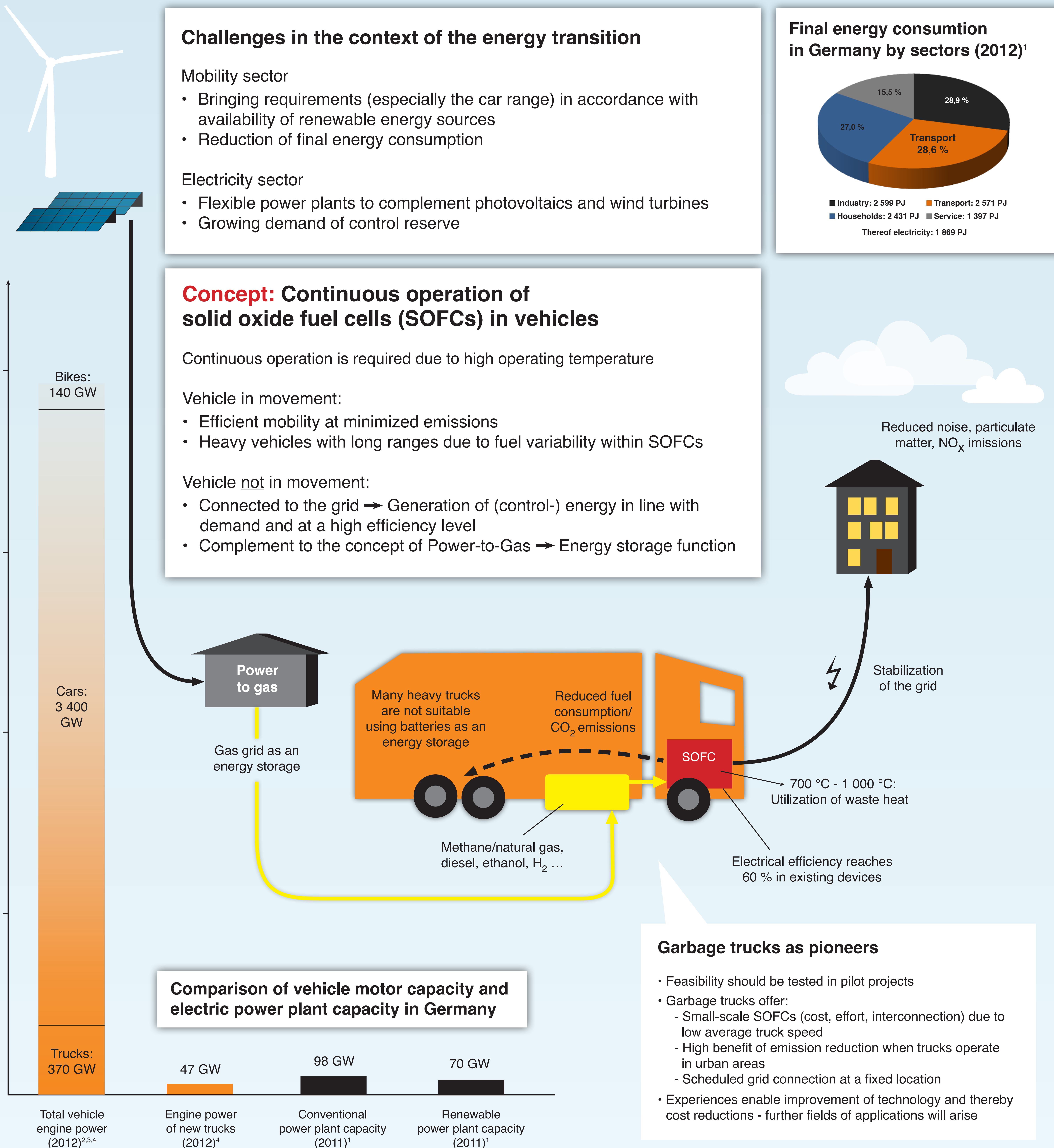
Continuous operation is required due to high operating temperature

#### Vehicle in movement:

- Efficient mobility at minimized emissions
- Heavy vehicles with long ranges due to fuel variability within SOFCs

#### Vehicle not in movement:

- Connected to the grid → Generation of (control-) energy in line with demand and at a high efficiency level
- Complement to the concept of Power-to-Gas → Energy storage function



#### References

- 1 BMWi, Zahlen und Fakten Energiedaten, 2013, available at: <http://www.bmw.de/BMWi/Redaktion/Binaer/energie-daten-gesamt.property=blog.bereich=bmw2012.sprache=de.rwb=true.xls>, accessed 11 November 2013.
- 2 KBA, FZ 21, 2013, available at: [http://www.kba.de/nn\\_125398/DE/Statistik/Fahrzeuge/Bestand/Motorisierung/motorisierung\\_\\_node.html?\\_\\_nnn=true](http://www.kba.de/nn_125398/DE/Statistik/Fahrzeuge/Bestand/Motorisierung/motorisierung__node.html?__nnn=true), accessed 11 November 2013.
- 3 KBA, FZ 25, 2013, available at: [http://www.kba.de/nn\\_125398/DE/Statistik/Fahrzeuge/Bestand/Motorisierung/motorisierung\\_\\_node.html?\\_\\_nnn=true](http://www.kba.de/nn_125398/DE/Statistik/Fahrzeuge/Bestand/Motorisierung/motorisierung__node.html?__nnn=true), accessed 11 November 2013.
- 4 KBA, Motorisierung - Breites Leistungsspektrum, 2013, available at: [http://www.kba.de/nn\\_124384/DE/Statistik/Fahrzeuge/Neuzulassungen/Motorisierung/2012\\_n\\_kurzbericht\\_\\_motorisierung\\_\\_nutzfz\\_\\_pdf.html](http://www.kba.de/nn_124384/DE/Statistik/Fahrzeuge/Neuzulassungen/Motorisierung/2012_n_kurzbericht__motorisierung__nutzfz__pdf.html), accessed 11 November 2013.